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according to size. The proof that these were not pyrenoids or any protoplasmic bodies other than nuclei was demonstrated by their amœboid properties.

Close scrutiny further showed a reticulated arrangement of the protoplasm, which had also been observed by Cienkowski, Hertwig and Lesser. These investigators were unanimous in considering that it was due to numerous non-contractile vacuoles. Zopf was struck with their uniformity in size, and the fact that under the highest magnification they did not appear to change their form or size in the least, as vacuoles would be likely to do. He therefore surmised that they might be solid bodies instead of empty spaces, and upon crushing an individual found it to be so. By micro-chemical tests these were shown not to be starch, cellulin or cellulose, but paramylum.

We can only glance at the remainder of this very instructive and interesting investigation. *Vampyrella vorax* was found to possess several nuclei and numerous paramylum bodies; *V. Spirogyræ*, *V. variabilis*, *V. pendula* and *Protomonas amyli* each contain a nucleus and contractile vacuole, or sometimes two or three. It is therefore evident that Hæckel's monera group must either be characterized anew or these species excluded; it is even possible that what is true of these may be true of all other members of the group.

Studies upon five new closely related species are given in addition to the above, and the whole is summed up under the headings morphological, biological and systematic.

Aside from the important facts which this memoir contains it is worthy of careful examination for its explicit and suggestive methods.

NOTES AND NEWS.

DR. CHARLES E. BESSEY, Lincoln, Neb., desires to obtain dried or alcoholic specimens of various species of *Cuscuta*, either by purchase or exchange.

SZYSZYŁOWICZ has published in Engler's *Jahrbuch* the first two parts of a paper on the systematic arrangement of the *Tiliaceæ*. It has not yet reached the genus *Tilia* which most concerns American botanists.

BENEDICT RÖZL died at Smichor, Prague, on Oct. 14 last, 61 years of age. He was an extensive collector, especially of orchids, and had traveled through the southern United States and other parts of North and South America.

THE DECEMBER NUMBER of *Queen's Microscopical Bulletin* appeared with a cover, a permanent acquisition which gives it more of a magazine appearance. Although a small journal, it contains valuable items for workers with the microscope.

THE POTATO ROT (*Phytophthora*) destroyed last year one-third of the crop in the State of Michigan, and a still larger proportion in New York. Michigan raises in prosperous seasons 9,000,000 bushels of potatoes. The importance of the thorough economic study of such a disease is sufficiently evident.

AT THE ANNUAL ELECTION of January 12, 1886, Mrs. E. Britton and F. J. H. Merrill were elected editors of the *Torrey Bulletin* for the coming year, to succeed Mr. W. R. Gerard. All exchanges or donations of papers or books for the club's library, are to be hereafter addressed "Torrey Botanical Club, Columbia College, New York City." Papers and notes for publication should be sent to the same address.

THE ITALIAN GOVERNMENT will open on March 2 an International Exhibition of apparatus for the application of remedies in solution, powder or mixture against animal and vegetable parasites of plants, especially the grape mildew. Prizes will be given as follows: One gold medal with \$100, three silver medals with \$30 each, and five bronze medals. A similar exhibition for southern France will be given February 15 to 17, under the auspices of the Central Agricultural Society of the Herault.

DR. W. T. THISELTON DYER, who has acted for some years as assistant director at the Kew Gardens, has been promoted to the directorate to fill the place left vacant by the resignation of Sir Joseph D. Hooker. Dr. Dyer's name is familiar to botanical students in this country as one of the translators of Sachs' Text-book, and also in other ways. The position of assistant, which has become of almost as great importance as that of director, has been offered to and accepted by Mr. D. Morris, F. G. S., heretofore Director of Public Gardens, Jamaica.

PROTOPLASMIC CONTINUITY in the Fucaceæ continues to be a subject of investigation by Thomas Hick. In the *Journal of Botany* for December he gives his results with *Himanthalia lorea* and *Laminaria digitata*, at the same time apologizing for including the latter with Fucaceæ. The most effective agents for swelling, clearing, and even dissolving were necessary. In both these cases continuity of protoplasm was clearly made out for the cortical and central tissues, but not at all for the epidermal. In *Himanthalia* continuity is maintained by means of comparatively stout cords of protoplasm and also by sieve-plates, while in *Laminaria* it is chiefly through the intervention of sieve-plates.

THE EXISTENCE of *Salvinia natans* in this country has always been doubted. The only evidence that it grows in the United States is the statement of Pursh that he saw it in Western New York, but his collections which went to Lambert's herbarium contain no specimens of it. Recently, however, Mr. C. H. Demetrio has forwarded to Dr. Asa Gray specimens of genuine *Salvinia natans* collected in a bayou of Bois Brulé creek in Perry Co., Mo. Whether the specimens are native or accidental introductions remains to be determined. It is hard to believe them native, as the plant could hardly be confined to so limited a locality and is conspicuous enough not to be easily overlooked where it does grow; and it is equally difficult to understand how they could possibly be introduced.

THE GEOGRAPHICO-BOTANICAL EXPOSITION held in Copenhagen last April under the supervision of M. Carl Hansen met with excellent success, according to a lithographed account just received. It was held in the halls of the Royal Danish Society of Geography, and aimed to give an idea of the vegetation of different regions of the earth by grouping living plants from conservatories and the open ground in as natural relations as possible. These were fully labeled, and additional information given by means of charts, pictures, etc. Although no prizes were given, both amateur and professional cultivators gave all possible aid, and the public showed its appreciation by a good attendance. This is one of the first exhibitions of the kind yet attempted, and its success ought to stimulate similar exhibitions elsewhere.

RED SNOW was the subject of a paper by Romya Hitchcock, before the Biological Society of Washington, which is printed in the December number of the *Amer. Micro. Journal*. Such snow was observed by De Saussure in Switzerland as early as 1760. The observations made by Captain Ross and the material brought by him from the Arctic regions in 1818 attracted special attention. It stained the snow deep crimson on the sides of cliffs eight miles in extent, and penetrated in places to twelve feet below the surface. It was then deemed of vegetable origin, but the affinities were not more closely determined. It has often been seen in recent years, and has been classed by different writers as a fungus, alga and lichen, and has at various times been placed in the genera *Uredo*, *Palmella*, *Protococcus*, *Lepraria* and *Chlamydococcus*, and its true position seems yet in doubt. Its growth and development has not yet been traced.